

1. An integrated circuit testing apparatus for testing an integrated circuit leaving an IC singulation station, comprising:

- a) a receiving means positioned in a pre test position for receiving the integrated circuit from the IC singulation station;
- b) a testing site, positioned to secure the integrated circuit after a displacement of said receiving means to a test position, the displacement positioning said integrated circuit in said testing site said test site having a test connection for making physical contact with said integrated circuit when it is secured in said testing site, a circuit test performed on said integrated circuit when it is secured in said testing site; and
- c) a holding station having a first post test position and a second post test position, said holding station receiving the integrated circuit in said first post test position from the receiving means following a return of the receiving means to said pre test position subsequent to the performing of the circuit test the integrated circuit;
- d) a first track for receiving the integrated circuit from the holding station when the holding station is in said first post test position and when the circuit test determines that the integrated circuit has a first test condition: and
- e) a second track for receiving the integrated circuit from the holding station when the holding station is in said second post test position, said second test position attained when said receiving means returns to said test position, said second track receiving the integrated circuit when the circuit test determines that the integrated circuit has a second test condition.

2. The apparatus of claim 1, wherein the holding station further comprises:

- a control pin for retaining the integrated circuit in the first post test position, when the integrated circuit has said second test condition, and for releasing the integrated circuit from the first post test position to said first track when said integrated circuit has said first test condition, and for releasing said integrated circuit from said second post test position to said second track when said integrated circuit has said second test condition.

3. A method for testing an integrated circuit in a testing apparatus after a departure of the integrated circuit from an integrated circuit singulation apparatus comprising the steps of:

- a) moving the testing apparatus to a loading position;
- b) loading the integrated circuit into the testing apparatus;
- c) moving the testing apparatus to a test position to position the integrated circuit for testing;
- d) performing electrical tests on the integrated circuit to provide a tested integrated circuit having identified first and second test conditions;
- e) moving the testing apparatus from the test position to position the tested integrated circuit for unloading;
- f) moving the tested integrated circuit to a first unloading position;
- g) unloading the tested integrated circuit from the first unloading position to a first track when it has said first test condition;

h) moving the tested integrated circuit to a second unloading position when it has said second test condition; and

i) unloading the tested integrated circuit from the second unloading position to a second track when it has said second test condition. 5

4. The method as specified in claim 3, further comprising moving said testing apparatus to said test position during said step of moving the tested integrated circuit to said second unloading position. 10

Subject 5. A testing apparatus for controlling positioning of a circuit before, during and after a circuit test is performed on the circuit, the circuit test determining first and a second test condition of the circuit, the apparatus 15 comprising:

a) a positioning apparatus having a first port and a second port and capable of displacement to a first position and a second position, said first port receiving the circuit for testing; 20

b) a testing apparatus for securing said circuit during a testing of the circuit, said positioning apparatus displaced to said second position during the testing; 25

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c) a testing control pin for retaining said circuit in said first port prior to the testing and for allowing a transfer of said circuit from said first port to said second port subsequent to the testing;

5 d) a first track for receiving said circuit from said second port when said circuit test finds said circuit to have the first test condition, said positioning apparatus being in said first position; and

10 e) a second track for receiving said circuit from said second port when said circuit test finds said circuit to have the second test condition, said positioning apparatus being in said second position.

6. The apparatus as specified in claim 5, further comprising an unloading control pin for retaining said circuit in said second port when said circuit test finds said circuit to have said second test condition and said testing apparatus is in said first position and for allowing a release of said circuit to said first track when said circuit test finds said circuit to have said first test condition and
20 for allowing a release of said circuit to said second track when said circuit test finds said circuit to have said second test condition.

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7. An integrated circuit testing apparatus for testing an integrated circuit leaving an integrated circuit singulation station, comprising:
a receiving apparatus positioned to receive untested integrated circuits from the integrated circuit singulation station;
a testing apparatus positioned to receive the untested integrated circuits from the receiving apparatus and test the integrated circuits to identify defective integrated circuits and non-defective integrated circuits, said testing apparatus including a holding station, a first position, and a second position, said testing apparatus while in said first position allowing tested integrated circuits to proceed to said holding station and allowing untested integrated circuits to be received from said receiving apparatus; and
a separating apparatus connected to the testing apparatus to separate defective integrated circuits from non-defective integrated circuits after testing thereof, said separating apparatus including a defective integrated circuit track for the defective integrated circuits and a non-defective integrated circuit track for the non-defective integrated circuits.

8. The apparatus of claim 7, wherein said testing apparatus while in said second position will electrically test the integrated circuit.

9. The apparatus of claim 8, further comprising:
the holding station while in the first position holding defective integrated circuits from proceeding to the separating apparatus, and allow non-defective integrated circuits to proceed to the non-defective integrated circuit track of the separating apparatus; and
the holding station while in the second position releasing defective integrated circuits to the defective integrated circuit track of the separating apparatus.

10. An integrated circuit testing apparatus for testing an integrated circuit leaving an integrated circuit singulation station, comprising:
a loading apparatus for supplying the integrated circuit leaving the integrated circuit singulation station to the integrated circuit testing apparatus;
a receiving apparatus positioned to receive untested integrated circuits from the integrated circuit singulation station;
a testing apparatus positioned to receive the untested integrated circuits from the receiving apparatus and test the integrated circuits to identify defective integrated circuits and non-defective integrated circuits, said testing apparatus including a holding station, a first position, and a second position, said testing apparatus while in said first position allowing tested integrated circuits to proceed to said holding station and allowing untested integrated circuits to be received from said receiving apparatus; and
a separating apparatus connected to the testing apparatus to separate defective integrated circuits from non-defective integrated circuits after testing thereof, said separating apparatus including a defective integrated circuit track for the defective integrated circuits and a non-defective integrated circuit track for the non-defective integrated circuits.

11. The apparatus of claim 10, wherein said testing apparatus while in said second position will electrically test the integrated circuit.

12. The apparatus of claim 11, further comprising:
the holding station while in the first position holding defective integrated circuits from
proceeding to the separating apparatus, and allow non-defective integrated
circuits to proceed to the non-defective integrated circuit track of the
separating apparatus; and
the holding station while in the second position releasing defective integrated circuits
to the defective integrated circuit track of the separating apparatus.

13. A method of testing an integrated circuit in a testing apparatus having a
test site, a holding station, a first position, and a second position, after the singulation
of the integrated circuit in an integrated circuit singulation apparatus, said method
comprising the steps of:
transferring the integrated circuit from the integrated circuit singulation
apparatus;
receiving the integrated circuit at the testing apparatus while the testing apparatus is in
the first position;
moving the testing apparatus to the second position;
testing the integrated circuit to identify defective and non-defective conditions of the
integrated circuit;
moving the testing apparatus to the first position to allow the tested integrated circuit
to proceed to the holding station while receiving a second singulated integrated
circuit into the testing apparatus; and
separating the defective and non-defective integrated circuits.

14. The method of claim 13, further including:
providing the testing apparatus with a non-defective and defective integrated circuit
track; and
maintaining the holding station in the first position to prevent defective integrated
circuits from proceeding to the non-defective track, and allowing non-defective
integrated circuits to proceed to the non-defective integrated circuit track.

15. The method of claim 14 further including, moving the holding station
to the second position and allowing the defective integrated circuit proceed to the
defective integrated circuit track.

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16. A method of testing an integrated circuit after the singulation thereof
using a testing apparatus having a test site, a holding station, a first position, and a
second position, said method comprising the steps of:
transferring the integrated circuit from the integrated circuit singulation
apparatus;
receiving the integrated circuit at the testing apparatus while the testing apparatus is in
the first position;
moving the testing apparatus to the second position;
testing the integrated circuit thereby identifying defective and non-defective conditions
thereof;
moving the testing apparatus to the first position after testing of the integrated circuit;
allowing the tested integrated circuit to proceed to the holding station;
receiving a second singulated integrated circuit into the testing apparatus while in the
first position; and
separating the defective and non-defective integrated circuits.


17. The method of claim 16, further including:
providing the testing apparatus with a non-defective and defective integrated circuit track; and
maintaining the holding station in the first position to prevent defective integrated circuits from proceeding to the non-defective track, and allowing non-defective integrated circuits to proceed to the non-defective integrated circuit track.

18. The method of claim 17 further including, moving the holding station to the second position and allowing the defective integrated circuit proceed to the defective integrated circuit track.

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19. A method of testing an integrated circuit in a testing apparatus having a test site, a holding station, a first position, and a second position, after the singulation of the integrated circuit in an integrated circuit singulation apparatus, said method comprising the steps of:
receiving the integrated circuit at the testing apparatus while the testing apparatus is in the first position;
moving the testing apparatus to the second position;
testing the integrated circuit to identify defective and non-defective conditions of the integrated circuit;
moving the testing apparatus to the first position to allow the tested integrated circuit to proceed to the holding station while receiving a second singulated integrated circuit into the testing apparatus; and
separating the defective and non-defective integrated circuits.

20. The method of claim 19, further including:
providing the testing apparatus with a non-defective and defective integrated circuit
track; and
maintaining the holding station in the first position to prevent defective integrated
circuits from proceeding to the non-defective track, and allowing non-defective
integrated circuits to proceed to the non-defective integrated circuit track.

21. The method of claim 20 further including, moving the holding station
to the second position and allowing the defective integrated circuit proceed to the
defective integrated circuit track.

Sub ~~22~~  22. A method of testing an integrated circuit after the singulation thereof
using a testing apparatus having a test site, a holding station, a first position, and a
second position, said method comprising the steps of:
receiving the integrated circuit at the testing apparatus while the testing apparatus is in
the first position;
moving the testing apparatus to the second position;
testing the integrated circuit thereby identifying defective and non-defective conditions
thereof;
moving the testing apparatus to the first position after testing of the integrated circuit;
allowing the tested integrated circuit to proceed to the holding station;
receiving a second singulated integrated circuit into the testing apparatus while in the
first position; and
separating the defective and non-defective integrated circuits.

23. The method of claim 22, further including:
providing the testing apparatus with a non-defective and defective integrated circuit track; and
maintaining the holding station in the first position to prevent defective integrated circuits from proceeding to the non-defective track, and allowing non-defective integrated circuits to proceed to the non-defective integrated circuit track.

24. The method of claim 23 further including, moving the holding station to the second position and allowing the defective integrated circuit proceed to the defective integrated circuit track.

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25. An apparatus for testing singulated integrated circuits, comprising:
a testing apparatus movable between a first position and a second position receiving untested integrated circuits while in said first position and identifying first and second test conditions of an integrated circuit while in said second position;
and
a separating apparatus coupled to and movable between the first position and the second position, receiving tested integrated circuits from said testing apparatus while in said first position and releasing tested integrated circuits having the first test condition while at said first position and releasing tested integrated circuits having the second test condition while at said second position.

26. The apparatus of claim 25, wherein said testing apparatus and said separating apparatus include at least one integral member moveable between said first position and said second position.

27. A method of testing singulated integrated circuits in a testing apparatus having a first position, a second position, and a holding station, comprising: receiving an untested, singulated integrated circuit into the testing apparatus while in the first position; moving the untested, singulated integrated circuit to the second position; testing the untested, singulated integrated circuit to determine first and second test conditions thereof; moving the tested, singulated integrated circuit back to the first position; allowing the tested, singulated integrated circuit to move to the holding station; receiving another untested, singulated integrated circuit into the testing apparatus while in the first position; and separating the tested, singulated integrated circuits having the first test condition from integrated circuits having the second test condition.

28. The method of claim 27, wherein said separating includes releasing tested, singulated integrated circuits having the first test condition while the holding station is in the first position and releasing tested, singulated integrated circuits having the second test condition while the holding station is at the second position.

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29. An apparatus for testing singulated integrated circuits, comprising:
a loading apparatus for supplying the integrated circuit leaving the integrated circuit
singulation station to the integrated circuit testing apparatus;
a testing apparatus movable between a first position and a second position receiving
untested integrated circuits while in said first position and identifying first and
second test conditions of an integrated circuit while in said second position;
and
a separating apparatus coupled to and movable between the first position and the
second position, receiving tested integrated circuits from said testing apparatus
while in said first position and releasing tested integrated circuits having the
first test condition while at said first position and releasing tested integrated
circuits having the second test condition while at said second position.

30. The apparatus of claim 29, wherein said testing apparatus and said
separating apparatus include at least one integral member moveable between said first
position and said second position.

~~31. A method of testing singulated integrated circuits in a testing apparatus having a first position, a second position, and a holding station, comprising: transferring the integrated circuit from the integrated circuit singulation apparatus; receiving an untested, singulated integrated circuit into the testing apparatus while in the first position; moving the untested, singulated integrated circuit to the second position; testing the untested, singulated integrated circuit to determine first and second test conditions thereof; moving the tested, singulated integrated circuit back to the first position; allowing the tested, singulated integrated circuit to move to the holding station; receiving another untested, singulated integrated circuit into the testing apparatus while in the first position; and separating the tested, singulated integrated circuits having the first test condition from integrated circuits having the second test condition.~~

~~32. The method of claim 31, wherein said separating includes releasing tested, singulated integrated circuits having the first test condition while the holding station is in the first position and releasing tested, singulated integrated circuits having the second test condition while the holding station is at the second position.~~